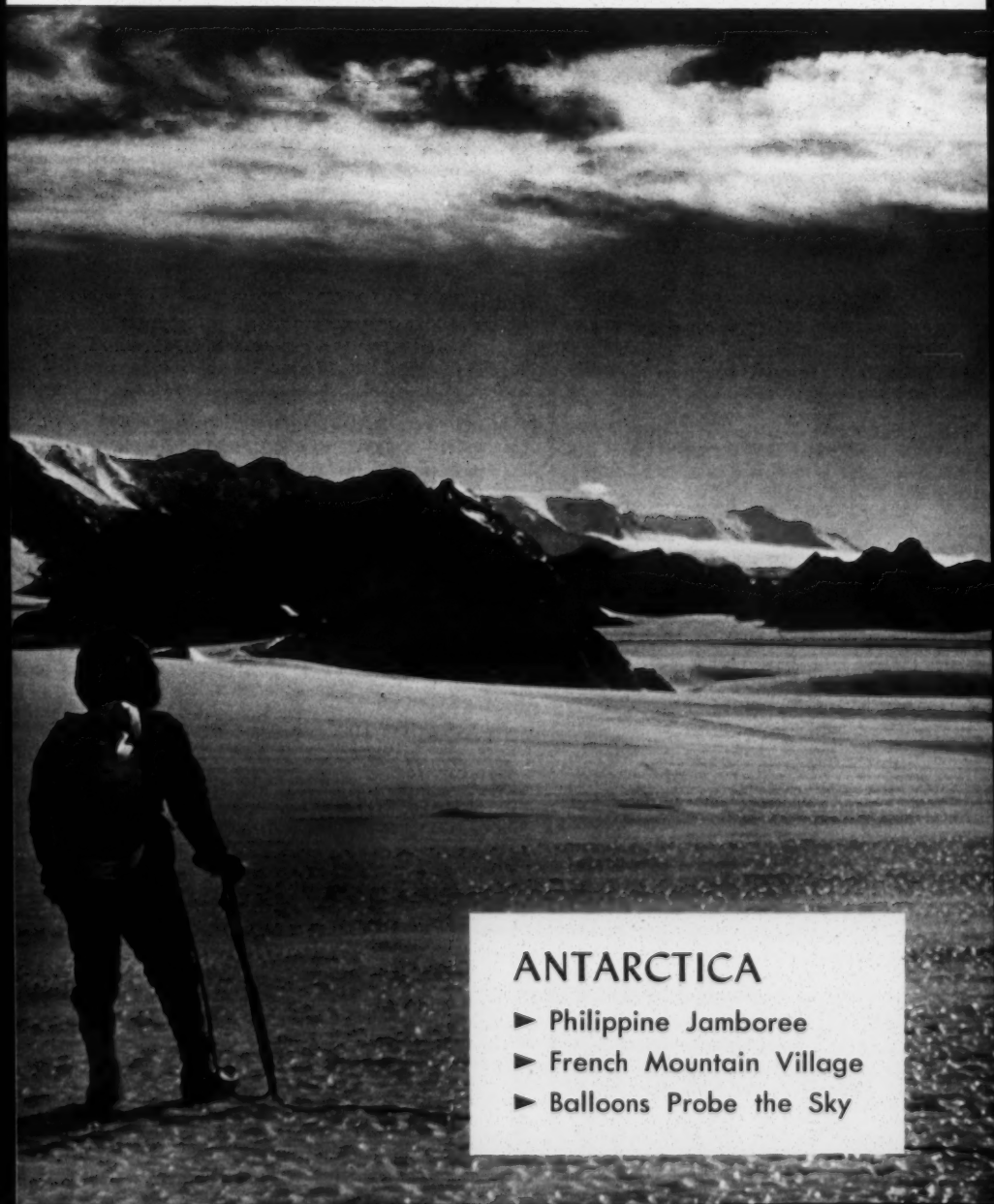
SCHOOL BULLETINS

JANUARY 18, 1960, VOLUME 38, NUMBER 14 . . . *To Know This World, Its Life*



ANTARCTICA

- Philippine Jamboree
- French Mountain Village
- Balloons Probe the Sky

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can be gained from them than for any commercial or military use.

One precedent contained in the Antarctic treaty might be easily applicable to space—the provision of prior notice of expeditions. Similar announcements of space rockets might prevent worried defenders from mistaking them for incoming missiles and starting war by error.

Like space, Antarctica holds a strategic position. The globe at right appears upside down, but only because we are accustomed to maps with north uppermost. Actually, either is a valid way of looking at earth.

It shows the white continent sprawling around the world's southern axis—the South Pole. High above its frozen surface, swirling winds manufacture weather for the Southern Hemisphere—and perhaps to some extent for the Northern as well.

Just as airlines now fly routinely between Eastern and Western Hemispheres over the Arctic areas of the North Pole, soon, explorers believe, they will cross the South Pole on time-saving routes from Australia and New Zealand to South America or Africa.

Further, while the earth rotates on its axis, the South Pole, where the axis passes through the sphere, stays still. Thus Antarctica can become a key station in the space age. Rear Admiral George J. Dufek, USN, commander of the United States Naval Support Force in Antarctica during the IGY, reported in the October, 1959, *National Geographic*: "...A satellite in a polar orbit could be observed from the South Pole every time it passed around the earth—at present speeds of 18,000 miles per hour, about every 90 minutes.

"Such satellites, when eventually manned, could be controlled better from the South Pole than from any other spot on the earth's land surface. By 'controlled' I mean given instructions for the pilot to break out of orbit and land."

Although much remains to be learned in Antarctica, the last few years have produced a good deal of information. Operation Deep Freeze, the United States four-year exploratory effort, cost $250,000,000. Only two percent of that went directly to scientific work. About $245,000,000 was needed just to set science up in business on the inhospitable ice.

Among the things learned:

About ice—

There is twice as much—6,600,000 cubic miles—as had been calculated earlier. Scientists have probed 1,000 years into the past, by taking cores of ice, from depths ranging to 1,000 feet. In these, each year's snowfall is a layer, and the cores can be read like the rings of a tree. They give past weather records

and, through grains of pollen carried in by the wind, give an idea of the world's vegetation—though not necessarily of Antarctica's.

About the continent itself—

Contrary to popular belief, Antarctica is *not* all ice. Large areas of bare ground have been found. Once thought to be a continuous continent, Antarctica now appears to be a complex of islands and folded mountain chains on one side, and a vast plateau on the other. There is some evidence that it may be two continents, separated by a deep trough, although it is not yet certain whether the trough is deep enough to make an arm of the sea between the two parts.

About the past—

Antarctica was not always barren.

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GUY WARREN; COVER, FRED DARLING

ANTARCTICA Landmark in the Search for Peace

THE COLD, BEAUTIFUL land above and on the cover offers man a laboratory of peace as well as of science.

Recently, the 12 nations that have worked most in Antarctica signed a treaty setting aside the continent—one-and-a-half times the size of the United States—for entirely peaceful purposes. No military maneuvers, equipment testing, atomic explosions, or atomic wastes will be allowed there.

Each nation will inform the others of its expeditions and bases; scientific data will be shared by all. Any installation is to be open to inspection by anyone at any time.

This treaty is an outgrowth of the International Geophysical Year, during which 66 nations helped amass knowledge of our earth. Exploring Antarctica was a key project in the IGY. Now, some of the IGY research stations appear likely to become permanent, and international cooperation will continue.

The signers of the treaty include the United States and Russia, Argentina, Australia, Belgium, Chile, France, United Kingdom, Japan, New Zealand, Norway, and the Union of South Africa.

This agreement could lead to important political, as well as scientific steps. A diplomat from South Africa observed, "If the olive branch of peace has to be carried into the world from the barren wastes of Antarctica, then, paradoxical as it may seem, it is as good a starting place as any for so momentous a mission."

He referred to hopes that the treaty can serve as a model for one that would reserve space for peaceful exploration. And, if space, why not earth?

The great southern continent has much in common with space. Both are relatively unexplored, although scientists are living in Antarctica (no man yet lives in space). Both regions are currently more important for the knowledge that

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About magnetism—

Earth's magnetic field—the shape of the force that points compass needles north—is not as stable as once thought. It is probably affected by other magnetic fields in space.

About the auroras—

It was conclusively proved that these bright displays in the sky occur at the same time in Northern and Southern Hemispheres—the result of bursts of radiation from the sun.

Many people—and even Admiral Dufek confesses he is one of them—have difficulty understanding what earthly good this sort of information is. On expressing this feeling to Rear Admiral Lloyd V. Berkner, he was told:

"Well, it is a little difficult to see how it matters, for example, that there are 6,600,000 cubic miles of ice down here instead of 3,240,000, as we formerly estimated. Yet that is a critical figure for studying the delicate balance of the heat and water system of the earth *(Geographic School Bulletins,* November 23, 1959). Science may one day use such figures to tell us extremely practical and valuable things about the earth's future.

"When you consider," the Admiral continued, "that in 35 years, at the rate we are going, there will be twice as many people alive as there are today (GSB January 11, 1960), you realize that science must come up with solutions for thousands of new problems. What we have been learning in Antarctica is the raw material for some of those solutions." F.S.

Interested students are referred to: *National Geographic*—"What We've Accomplished in Antarctica" by Rear Adm. George Dufek, October 1959 ($1); "The Crossing of Antarctica" by Sir Vivian Fuchs, January 1959 ($1); "Man's First Winter at the South Pole" by Dr. Paul A. Siple, April 1958 ($1); "Year of Discovery Opens in Antarctica" by David S. Boyer, and "Across the Frozen Desert to Byrd Station" by Comdr. Paul W. Frazier, including wall-map supplement of Antarctica, September 1957 ($1); "To the Men at South Pole Station" by Rear Adm. Richard E. Byrd, "We Are Living at the South Pole" by Dr. Paul A. Siple, and "Admiral of the Ends of the Earth" by Melville Bell Grosvenor, July 1957 ($1); "All-out Assault on Antarctica" by Rear Adm. Richard E. Byrd, August 1956 (out of print, refer to your library).

DAVID S. BOYER, NATIONAL GEOGRAPHIC STAFF

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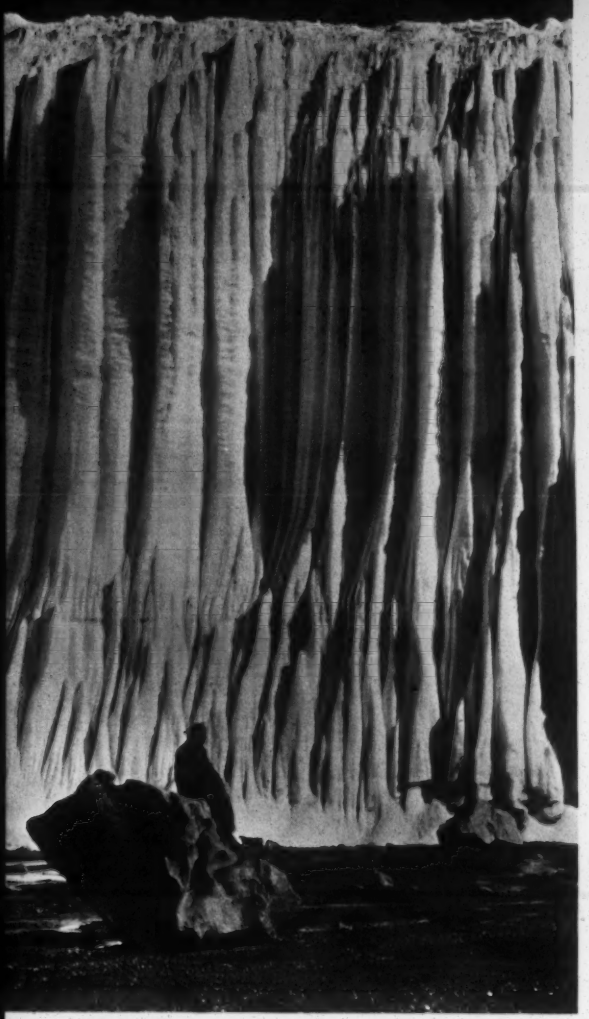


TROY L. PEWE

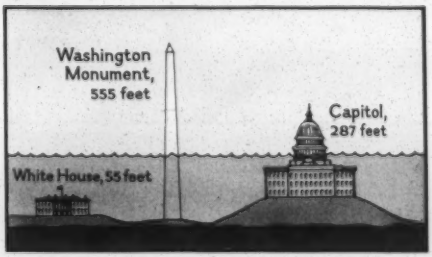
The Big, Cold Continent

SIZE: 5,500,000 square miles—21 times as big as Texas.

CLIMATE: Average annual temperatures range between —10 and —60 degrees Fahrenheit, with a low of —125 degrees, earth's lowest recorded temperature.

EARLY EXPLORATIONS: 16th century geographers put it on maps before it was discovered. Captain James Cook looked for it in 1770's, but convinced himself that if it were there, the continent was inaccessible and of no value. Discovery awaited a New England captain, N. B. Brown, who searched in 1821 for new sealing grounds. About the same time Russian explorers found islands off the coast.

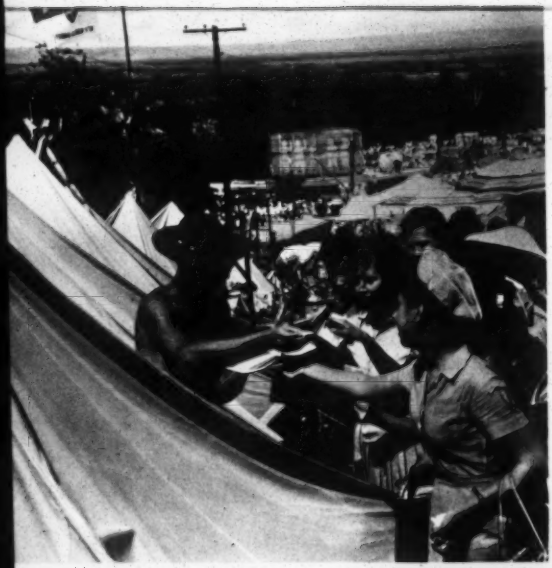
WALL OF ICE 150 feet high dwarfs an explorer in Antarctica's Taylor Valley. Although winter snows add to its bulk, the glacier does not grow. Erosion, evaporation, and the summer's melt have kept this mile-wide ice face at a standstill for a century. If all of Antarctica's ice melted, the world's oceans would rise to the point that many cities, including Washington, D. C. (below), would be under water.



Once it supported a green jungle. Pine, swamp palm, laurel, fig, beech, sequoia, and huge fern once thrived. Wherever the wind sweeps the snow from a mountain flank or a valley, from the Palmer Peninsula to the Queen Maud Range, within 300 miles of the Pole, geologists can find fossils of these plants. Explaining how the continent changed to a land of perpetual ice and snow is a harder task.

About plants and animals—

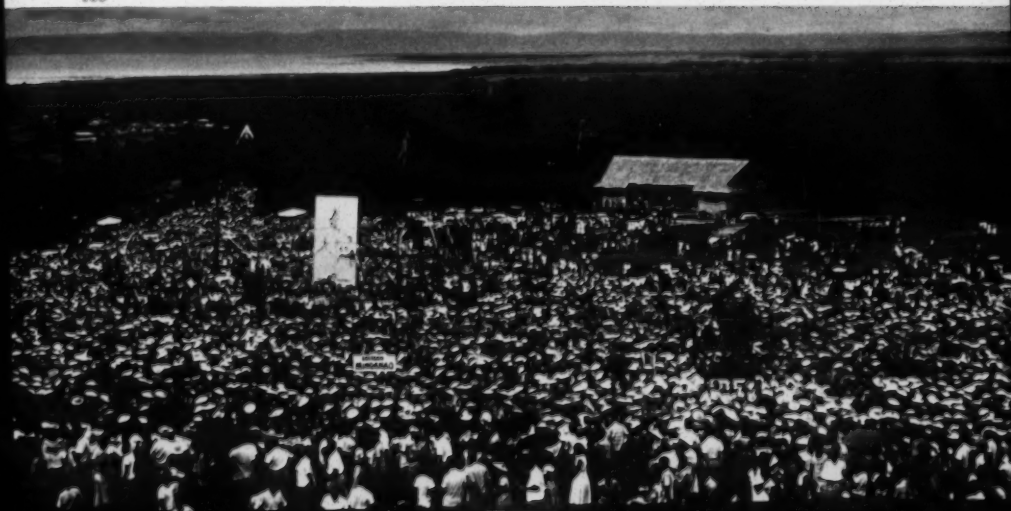
Simple plants—blue-green algae and lichens—grow in partly ice-free lakes in Antarctic valleys; no one knows how they developed there. Continuing studies of the comical Adélie penguins (below) have included placing tiny thermometers and radio sets in their eggs while the birds brooded them. This technique revealed that even with air temperatures well below freezing, the penguins kept their eggs at a temperature of 92.7° F.



TRAPPED by a bevy of Filipina Girl Scouts, Jack Grams of Somerdale, New Jersey, smilingly stands "autograph duty." The United States boys were so popular with the 12,000 delegates from other countries that we took turns giving autographs at our camping area.

EACH COUNTRY took part in the program. I took this shot of the Nationalist Chinese delegation performing a dragon dance. It was a great civics workshop for me, a teen-ager from Mount Vernon, New York, to be able to walk over to the next tent and talk with Scouts from Israel, Egypt, India, Pakistan, or Thailand.

FINAL CEREMONY of the 10th World Jamboree covered Mount Maquiling, 35 miles southeast of Manila, with a sea of *salacots*. One Sunday 300,000 visitors came to see our exhibits, creating one of the biggest traffic jams in Philippine history. When the 10-day encampment ended, we left all equipment, from tents to water bags, for our hosts, the Philippine Scouts. We flew home, completing a round-the-world trip touching 13 countries.



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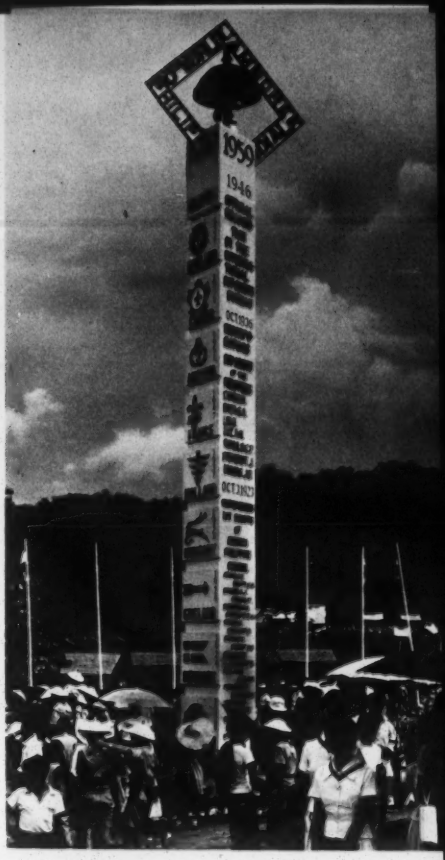
Boy Scout Jamboree in the Philippines

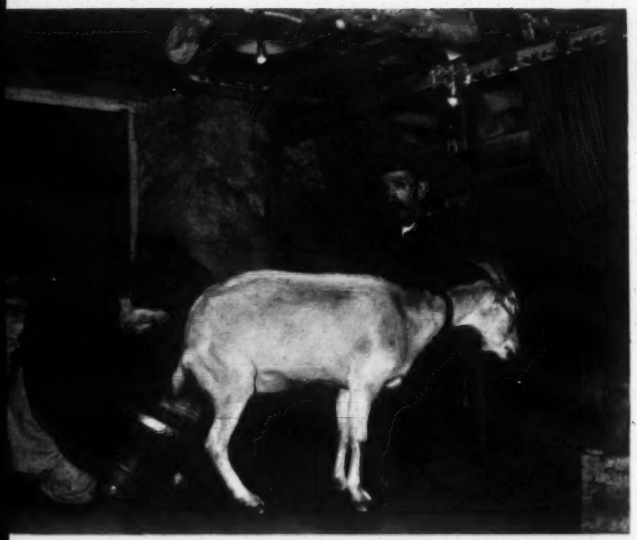


By Steven D. Bellew
Photographs by the author

EVERY FOUR YEARS Boy Scouts hold a world-wide get-together. I was one of the 220 American Scouts lucky enough to attend the 10th International Jamboree, held in the Philippines, the first such rendezvous in an Asian country. Nothing could have given me a better lesson in international understanding.

I pitched tents, took part in ceremonies, and mingled in off-duty hours with boys from 51 countries. Nationalities dissolved in gab fests around the Jamboree totem pole (upper right).

Trading sessions broke barriers like magic. That's me in the black trunks (above) negotiating a swap with a new friend. The woven straw *salacots* we're wearing came in handy in the frequent downpours. Filipino Scouts carried palm-frond raincapes on their backs (right), unrolled them when it started to sprinkle. Here they prepare to enter the arena for the grand review.



BEDROOM TURNED DAIRY—Nanny obligingly yields milk in the room she shares with the Blanc family, a typical household of Saint Véran. Pigs also may live in village bedrooms. Each farmer buys a piglet in the spring and raises it in a hutch, usually at the foot of his bed. There it grows on food carried to it, until it is led to slaughter eight or ten months later. Other animals also live with village families. Cows are stabled off the kitchen, chickens often roost in the living room.

mile along a mountain slope, as if sunning itself on a great south-facing balcony. One narrow road leads to the valley below. Houses cluster in small neighborhoods.

The seasons control Saint Véran; in winter, life all but stops. Daily tasks are reduced to feeding and care of livestock and doing the wash. Women boil and soap their clothes at home, then beat them with wooden paddles in the icy waters of neighborhood fountains.

Spring calls the men into the field to plow, the animals to the pastures to graze. In the two-month summer, the villagers must cut enough hay to feed the cows over the winter. Harvest time follows. Sheaves of oats, rye, and barley are threshed and the grain is milled for the annual bake. Each family, its bread dough mixed at home, draws lots for its turn to use the community oven. Below, a woman forms her loaves on boards. Mother fills the oven once for each member of the family; the supply lasts until next year's baking.

Much of the village work is done cooperatively. When a church, a bridge, or the canal that brings mountain water to the village fields needs repairs, each family contributes a worker.

For all its old-fashioned ways, however, Saint Véran also has a claim on the 20th century. Her young men return from military service with new ideas. Summer visitors make their way up the mountain. Silos now intrude on the landscape. One man uses a gas-powered mower in some of the larger fields. L.B.

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PHOTOGRAPHS BY ROBERT K. BURNS, JR.; MAP © NGS

The Village Time Passed By

THE RAT-A-TAT-TAT of the town crier's drum resounds in the narrow street. House doors pop open, and the herald gives the day's official pronouncements. Bell tinkling, a cow clatters through the kitchen to her household stable. Absorbed in mixing dough, the housewife pays no attention. Villagers rummage through socks, shoes, and belts in the mobile street bazaar (above). Traveling merchants in trucks labored up the mountainside to bring the clothing to the outdoor shop.

The place is Saint Véran, France's highest village, nestling 6,690 feet up in the French Alps. One foot in the Middle Ages, the other in the 20th century, the remote community clings to time-hallowed ways.

Its 255 citizens live in old look-alike stone houses which are also stables for the animal population—cows, goats, sheep, pigs. Almost nowhere in the structures can one find a true right angle—a medieval fear was that the devil lurked in 90-degree corners.

The village stretches two-thirds of a

On one of the earliest manned flights Controlling the horizontal drift of

the balloon was difficult, as it still is. Flyers landed in a variety of places—trees, haystacks, and oceans or, when they were lucky, flat fields.

Still, balloon fever spread across Europe and to the United States. Scientists, generals, and showmen found many uses for the gas bags. Napoleon's generals soon saw the possibilities of the balloon as a spy. American soldiers in the Civil War used them as observation platforms. Both sides directed artillery fire from balloons in World War I. During World War II, the Japanese drifted across the Pacific 9,000 bomb-laden paper balloons. They caused six U. S. casualties.

Balloons had barely gotten off the ground when scientists commandeered them. In 1874, a doctor rose over London to study the atmosphere.

Today huge high-flying balloons are exploring the edge of space and sending back data on astrophysics, astronomy, meteorology, and aeromedicine.

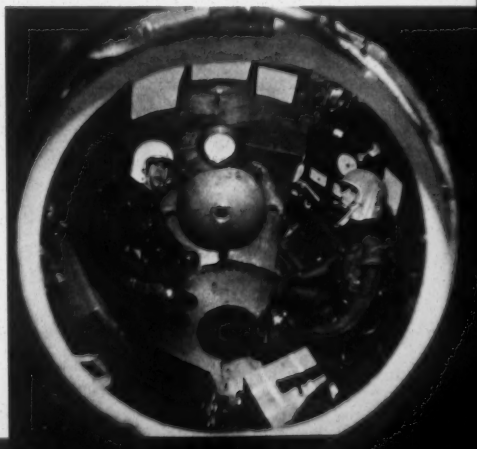
The balloon provides time for extensive observation and recording, and an excellent platform from which to study the threshold of space: the band between 100,000 and 200,000 feet above the earth's surface where flyers are above 99 per cent of the earth's atmosphere.

Some balloons go up laden only with instruments—cameras for photographing the earth and celestial bodies, devices to record temperatures and cosmic rays, containers for taking samples of the atmosphere at various levels, and, often, apparatus which automatically radios data back to earth.

Other balloons take along men, plus instruments necessary for survival—oxygen systems, food, parachutes.

In 1956, Lieutenant Commanders Malcolm D. Ross and M. Lee Lewis (below) rode a balloon-carried pressurized aluminum gondola to a height of 76,000 feet. The flight broke the altitude record

RICHARD H. STEWART; THOMAS J. ABERCROMBIE, NGS STAFF, RIGHT



RECORD BREAKERS: The ground crew closes in to attach the gondola to the bag of *Explorer II* (above) as the balloon is prepared for its historic 1935 flight. The National Geographic-Air Corps project reached 72,395 feet, shattering all previous altitude records. Twenty-one years later two naval officers, seen at right through a hatch of the gondola of their *Strato-Lab*, broke the record of *Explorer II*. They took their balloon to 76,000 feet.

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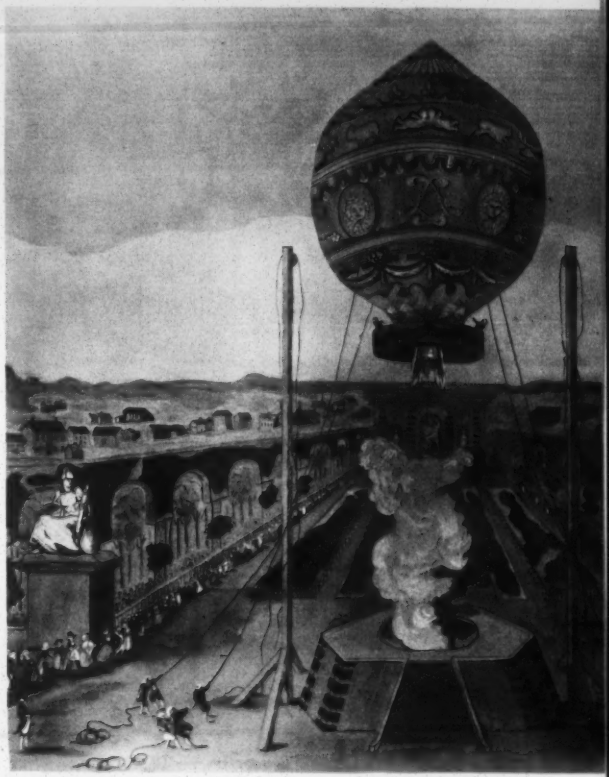
NEW ERA FOR VERSATILE BALLOONS

Gasbags Reach The Edge of Space

AS ROCKETS thunder toward space, and jet planes link continents with breath-taking speed, the caterpillar-paced balloon, man's first means of flight, is still a vehicle of prime importance—as the remarkable recent series of high-altitude ascents shows.

Indeed, the pace of the balloon is a virtue. Its slow rise and ability to hover at a specified altitude make it superior to jets and rockets for certain tasks.

Nothing more than a bag filled with a gas lighter than air, the balloon was born in 1783. Flying had fascinated men for a long time. Early Greeks sang of Daedalus and Icarus who fastened wings to their bodies with wax and took to the air. Leonardo da Vinci is said to have filled thin wax figures with hot air and made them fly as early as 1513. A Jesuit, 150 years later, drew plans for a balloon-lifted airship. Another priest sent up a small balloon over Lisbon in 1709.



SMITHSONIAN INSTITUTION

Later, the Montgolfier brothers of Annonay, France, found that paper bags held over the hot air of the kitchen fire rose to the ceiling. They continued to experiment along this line. Their bags got bigger and bigger until the Montgolfiers ushered in the air age in 1783 by sending up over Annonay a 500-pound balloon of paper and linen, raised by a fire of wood and straw.

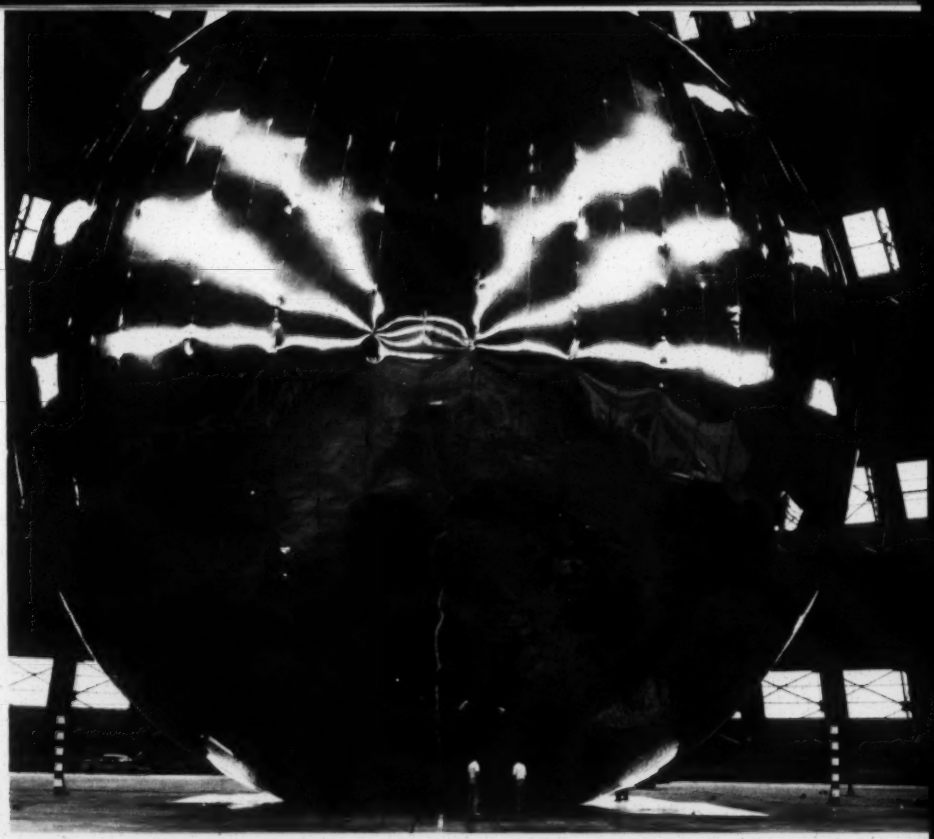
Four months later, while King Louis XVI looked on, the first balloon passengers—a duck, a sheep, and a rooster—cruised over Versailles. The following month, for the first time, a man flew.

On one of the earliest manned flights (above), the balloon was controlled by ropes from the ground. Not long afterwards, a balloon, free of its tethers, carried passengers to a height of 500 feet, and stayed aloft over Paris for 25 minutes.

The early balloonists, like early airplane pilots, flew by the seat of their pants. Their vehicles were not very airworthy. Hot-air balloons stayed above the ground only as long as the air inside was warmer than that outside. When a fire kept the inside air warm, there was always the danger that sparks might set the bag afire.

Balloons inflated with hydrogen—a type that developed along with the hot-air balloons—could stay up easily, but the gas is highly inflammable. (Later, helium, light but nonburning, replaced both hydrogen and hot air.)

Controlling the horizontal drift of



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FUTURE SPACE TRAVELER—New balloon satellite undergoes ground inflation tests

for a manned balloon set 21 years earlier by Army Captains Albert W. Stevens and Orvil A. Anderson in *Explorer II*. The pioneer 1935 flight—sponsored by the National Geographic Society and the United States Army Air Corps—reached 72,395 feet. Using about a ton of equipment, the men brought back important information on cosmic rays, the sun, the character of the high air, and high-altitude radio transmission.

The present manned balloon altitude record is 101,516 feet, set in 1957 by Air Force Major David G. Simons.

In this flight, Major Simons himself was the object of study. Human reactions to close confinement, solitude, isolation from earth, and silence are important factors for space travel.

Balloon-hoisted cameras have photographed the sun with unprecedented sharpness. Late last year two men took cameras and telescope 15 miles into the sky to get a closer look at Venus. Above the dust particles and other contamination of the earth's atmosphere, they found the first evidence of water vapor in the atmosphere of that mysterious planet.

A balloon has carried a rocket 100,000 feet high, then launched it for a flight of 2,700 miles into space. In turn, rockets have launched balloons into upper air.

The balloon above, 100 feet in diameter, will be folded into a metal container only 30 inches in diameter, sent aloft at the head of a rocket booster, and automatically inflated in space.

Recently tested over the east coast, this new balloon has two proposed uses: as a satellite in orbit around the earth—its bright aluminum coating can be used to reflect long-distance radio, radar, and television signals—and for moon probing. Its coating will also make it easily visible to the naked eye from earth. L.B.

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